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F. M. 100

LABOR AND POWER

Used for Farm Enterprises

INDIANA

1950

by Reuben W. Hecht

UNITED STATES DEPARTMENT OF AGRICULTURE
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PREFACE

The Bureau of Agricultural Economics makes annual estimates of the total man-hours of labor used in farming in the nine geographic divisions and in the United States. 1/ Comparable data have also been developed for each State for 2 years. 2/ These estimates are made by applying average man-hours per acre or per head to the official estimates of acres of crops and numbers of livestock. Man-hours per acre or per head vary from year to year, depending on yields, degree of mechanization, and other factors. The labor rates per acre and per head are not the result of special surveys; they are estimates based on secondary sources such as farm-management reports, studies of costs of production, and analyses of changes in farm practices and mechanization. These sources provided considerable data for some enterprises and areas and a great deal less for others.

The survey upon which this report is based was undertaken to provide current data as an aid in keeping these series up to date. It was conducted in four States; Idaho, Indiana, Mississippi, and Pennsylvania. A publication presenting the results of the survey in Idaho is available. 3/ Similar reports are being prepared for Mississippi and Pennsylvania.

1/ Hecht, Reuben W. and Barton, Glen T., Gains in Productivity of Farm Labor, U. S. Dept. Agr. Tech. Bul.. 1020, 1950.

2/ Cooper, M. R. and others, Labor Requirements for Crops and Livestock, U. S. Bur. Agr. Econ., F.M. 40, 1943 [Processed] and Hecht, Reuben W., Farm Labor Requirements in the United States, 1939 and 1944. U. S. Bur. Agr. Econ. F.M. 59, 1947 [Processed].

3/ Hecht, Reuben W., Labor and Power Used for Farm Enterprises, Idaho, 1950. U. S. Bur. Agr. Econ. F.M. 95, 1952 [Processed].

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F.M. 100

LABOR AND POWER USED FOR FARM ENTERPRISES, INDIANA, 1950

By

Reuben W. Hecht, Agricultural Economist

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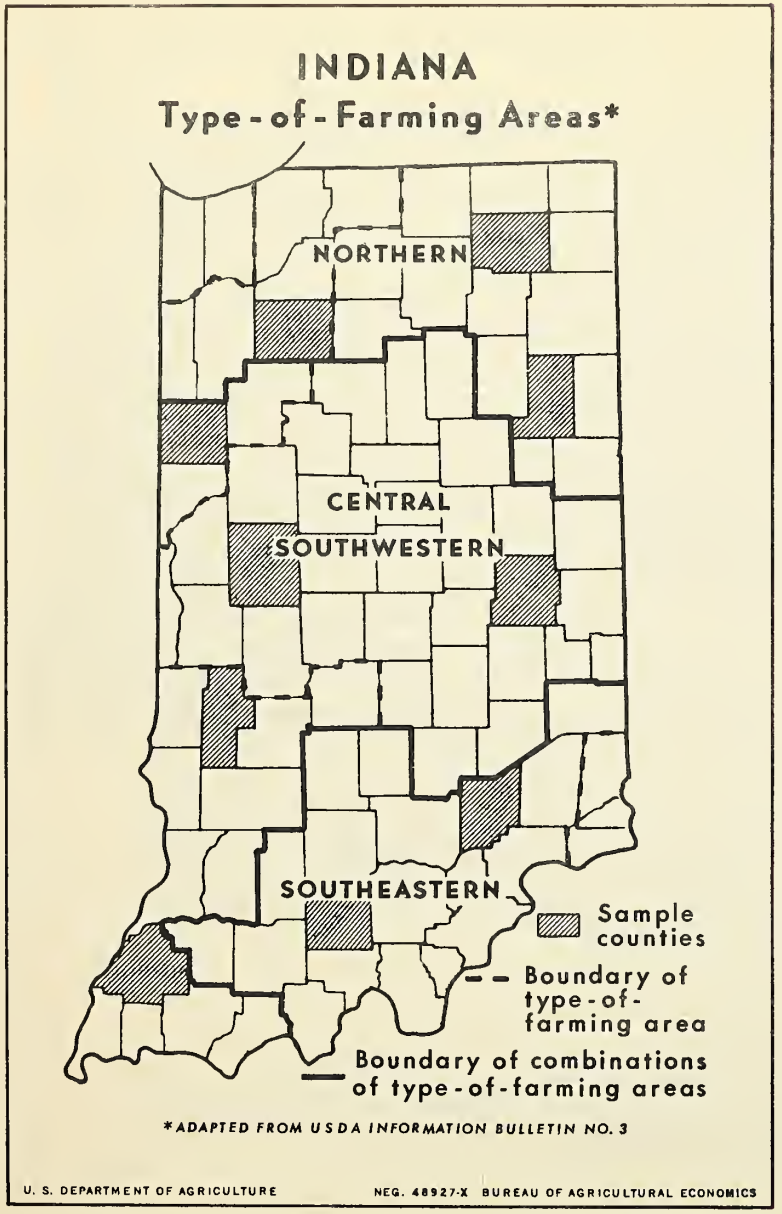
HOW THE SURVEY WAS CONDUCTED

A "locality" type of questionnaire, in which each farmer answered for his locality rather than for his particular farm, was used in the survey upon which this report is based. This approach was used to obtain a wider coverage of areas and enterprises with a given quantity of resources.

As indicated on the map on the following page, sampling was done by type-of-farming areas. Representative counties were selected within each area represented in the State. The number of counties per area depended primarily on the size of the area. Counties were not selected in two small areas - the specialized dairy area consisting of Lake and Porter Counties in the northwestern part of the State and the area composed of Dearborn, Ohio, and Switzerland Counties in the southeastern part of the State. To provide a more manageable summary and presentation, the data obtained in similar or adjacent type-of-farming areas were combined. The Northern area includes the Indiana portions of type-of-farming areas IV-A2, V-B2, V-D1, and V-H2 as shown in United States Department of Agriculture, Agriculture Information Bulletin No. 3. The Central-



Southwestern area includes V-C1 and V-C2 and the Southeastern area includes VI-H1 and VI-H3.

In selecting farmers to interview, persons living within each sample county who were in a position to know farmers were asked to prepare lists of "well-informed farmers" representing the entire range in size of crop and livestock enterprises and location within the county. While the most reliance was placed upon the County Extension Agents, others who prepared lists in the various counties included Production and Marketing Administration Committeemen, other representatives of the United States Department of Agriculture, dealers in farm supplies, and representatives of companies that process farm products such as milk, fruits, and vegetables. Insofar as possible, farmers from each part of the county who appeared on these lists were selected for interview.

THE QUESTIONNAIRE

The questionnaire was composed of three records: labor requirements for crops, for livestock, and for farm maintenance. Completed records were obtained from farmers in a number of combinations, not necessarily one of each from every farmer interviewed.

Each farmer from whom a crop record was obtained, was asked to indicate the operations performed in growing, harvesting, and marketing one or more of the crops he had grown for several years; and for each operation, the proportion of the acreage done with each kind and size of power unit and machine and the hours used per acre. He was asked to supply the average yield in his locality in the last few years. For certain crops other pertinent information was requested, for example, the length of stand for perennial crops such as alfalfa.

For livestock, each farmer was asked to give the number of each kind on his farm, and to estimate for a comparable size of herd or flock the average time spent in his locality, during each season, in doing daily chores and other jobs. He was asked also to give average production items, such as milk per cow, eggs per hen, and selling weights of meat animals.

For farm maintenance work, each farmer was asked to estimate the average time spent per year on each of several farm maintenance jobs on farms in his locality that were similar to his in size and other respects. He was asked also to indicate the total number of hours spent at farm work per year by kind of worker on farms of comparable size in his locality.

Farm maintenance work includes such jobs as repair of machinery; construction and maintenance of buildings, fences, irrigation and drainage structures; soil conservation work that is not part of a regular crop operation; work on farm forests and permanent pastures; and time for business trips and other farm business and miscellaneous jobs.

APPRAISAL OF SURVEY METHOD

This locality survey was set up on the assumption that even though farming methods are changing rapidly alert farmers keep abreast of local changes. They know the kinds and sizes of power units and machines used by their neighbors in crop production. They know the kind and number of operations usually performed and how much time each takes. Consequently, when farmers are questioned in a systematic manner regarding time requirements for crop production in their locality, as they were in this survey, a moderate number of records will yield averages that do not differ greatly from those derived from individual farm questionnaires. Comparison of rates of performance of tractor-drawn machines obtained in this survey with those collected with an individual farm questionnaire by the Indiana Agricultural Experiment Station lends credence to this assumption.

In most instances, a much greater number of individual farm than of locality records were obtained, yet differences between rates of performance collected by the two methods are small (table 1). The largest differences occurred in the Northern area. In this area the rates of performance of small grain drills varied the most (19 percent) but this difference amounted to only 7 minutes per acre. The difference in the rates obtained by the 2 methods for the 8 representative machines listed averaged 5 minutes per acre. At least some of these differences can be attributed to the different years in which the records were obtained. A greater percentage of the tractors in 1950 than in 1946-47 were mounted on rubber tires, developed more horsepower and operated at higher speeds than those in use 3 or 4 years earlier.

Fewer differences in rates of performance are apparent in the Central-Southwestern area where the records were all obtained in the same year. In this area, of the eight performance rates developed from locality records, three are higher, two are the same, and three are lower than those derived from records of individual farms. In none of the areas do the sample counties in which the records were taken agree. There is lack of agreement, particularly in the sample

Table 1.- Rates of performance of selected tractor-drawn machines: Comparison of averages obtained with locality and individual farm questionnaires in indicated areas, Indiana, specified years, 1946-50

Operation	Size of machine	Northern				Central-Southwestern				Southeastern			
		Locality, 1950		Individual farm, 1946-1947 1/		Locality, 1950		Individual farm, 1950 1/		Locality, 1950		Individual farm, 1948 1/	
		Cases	Rate per acre	Cases	Rate per acre	Cases	Rate per acre	Cases	Rate per acre	Cases	Rate per acre	Cases	Rate per acre
		Number	Hours	Number	Hours	Number	Hours	Number	Hours	Number	Hours	Number	Hours
Plowing	2-14 inch bottoms	47	1.12	398	1.34	104	1.10	125	1.19	39	1.21	67	1.34
Tandem disking	7-foot	35	.38	370	.46	92	.40	99	.39	51	.45	153	.46
Planting corn	2-row	18	.52	146	.61	32	.55	85	.50	19	.58	30	.72
Cultivating corn	2-row	31	.52	229	.56	52	.48	104	.48	21	.67	70	.60
Picking corn	1-row	12	1.19	115	1.26	22	1.25	30	1.38	7	1.24	23	1.44
	2-row	18	.70	68	.70	43	.74	69	.95	7	.83	10	.96
Drilling small grain	7-foot 2/	8	.47	29	.58	15	.53	67	.53	15	.58	25	.59
Combining small grain	6-foot	13	.69	100	.75	34	.69	72	.68	9	.89	36	.83

1/ Turner, James P., Standards for Rates of Performance of Farm Tasks Under Various Conditions. Unpublished Thesis Submitted to the Faculty of Purdue University June, 1951.

2/ 8-foot drills in the Northern area, as only 2 locality records of 7-foot drills were obtained.

counties in the Central-Southwestern area. The individual farm records were all obtained in counties located in the central part of the State, whereas three of the sample counties in which the locality data were collected were in this general area and the other two were in the southwestern part of the State. In general, the topography of the southwestern part of the State is more uneven than that of the central part. It is reasonable to expect that more time is required to perform field operations in the former area.

In the Southeastern area, hours per acre based on locality records are lower for four of the machines listed, about the same for two, and greater for the other two.

For several reasons, many farmers find it difficult to report accurately the amount of time spent on the different livestock enterprises. It is more difficult for them to report time spent on livestock than on crops particularly when the amount of labor used is requested on a locality basis. Farmers can readily see how much and what kind of work is being done with crops on neighboring farms. Equal opportunity to observe time for livestock chores on neighboring farms does not exist.

Frequently, parts of the chore work on a particular kind of livestock are done by different persons and often children are involved. Division of work may be on the basis of the amount of physical strength or skill demanded by the different jobs. Even with only one person concerned, the flow of chore work on many farms is by kind of job rather than by type of livestock. For example, a farmer may feed several types of livestock as an uninterrupted task rather than doing continuously all the chore work on one type of livestock. These things, however, affect similarly data given by farmers regardless of whether they report for their own farms or for their localities.

The same problems are encountered in the collection of data regarding time for farm maintenance jobs as in the collection of data on labor requirements for livestock. Farm maintenance work is done intermittently and farmers find it hard to think in terms of the total time spent on it.

In any survey, the responses to any question that requires a numerical answer vary considerably. In this survey, there appeared to be more than the usual proportion of high answers to questions on yields of some crops, some of the livestock production items, and the total hours spent at farm work, particularly by farm operators. These high responses may have resulted from a variety of causes, but an important one may have been that figures which represented an "average" for more than one year were requested. Farmers probably tend to think of yields received in the more favorable years as being close to rather than above average. Data from the Census, the Crop Reporting Board, and other sources facilitated thorough checking and editing of the records received in this survey.

LABOR AND POWER REQUIREMENTS FOR CROPS

The information on labor and power requirements for crops collected in this survey are presented in tables 2 to 15. Data for most crops are shown for all three areas of the State, but for some crops, such as mint for oil, data are shown for fewer than three areas because they are not extensively grown in all parts

of the State. Average man- and power-hours per acre are shown to the nearest hundredth of an hour even though that degree of accuracy does not exist in the data. This was done to prevent the time for some operations from dropping out of the average for the total acreage. Another option would have been to do more rounding and footnoting.

Corn

In preparing land for corn, the initial cultural operation in all areas was to plow with a moldboard plow, except that around a tenth was disked before it was plowed in both the Northern area and in the Central-Southwestern area. (table 3). Preparing the seedbed after plowing took about an hour per acre in both of these areas. An hour and a half per acre was required in the Southeastern area, even though the land was covered fewer times - an average of 2.4 times compared with 2.7 times in the Central-Southwestern area and 3.2 times in the Northern area. After planting, 47 percent or more of the corn in the different areas was rotary-hoed 1 or 2 times. There was also some harrowing after planting and all of the corn was cultivated about 2.5 times.

A little more than 4 man-hours were required for all preharvest work in the Northern area and in the Central-Southwestern area. Almost 7 man-hours were required in the Southeastern area, principally because many farmers used horses rather than tractors for some of the operations. For example, about a third of the corn was planted and about a tenth was cultivated with horses.

A large proportion of the corn for grain in the State was harvested with mechanical pickers. Other methods were used the most extensively in the Southeastern area. The methods and machines used in the corn harvest are summarized in table 2.

Table 2.- Corn: Extent of various methods of harvest in indicated areas, Indiana, 1950

Method of harvest	Northern	Central-Southwestern	Southeastern
	Percent	Percent	Percent
Pick from standing:			
stalk			
1-row picker	31	27	49
2-row picker	65	68	28
Pick by hand	4	5	17
Cut and shock			
Husk by hand	-	-	2
Husker-shredder	-	-	4

Methods of harvesting were reflected in the harvest labor requirements. The largest number of man-hours per acre was used in the Southeastern area where mechanical pickers were used the least. Requirements for harvesting corn in this area averaged 4.8 hours per acre compared with 2.3 and 2.6 hours in the other two areas. Total labor requirements were 6.4 man-hours per acre in the Northern area, 6.7 in the Central-Southwestern area, and 11.7 in the Southeastern area.

Table 3.- Corn: Man- and power-hours per acre in indicated areas, Indiana, 1950

Operation	Northern 1/				Central-Southwestern 2/				Southeastern 3/			
	Acreage covered		Man-hrs. per acre for total acreage		Acreage covered		Man-hrs. per acre for total acreage		Acreage covered		Man-hrs. per acre for total acreage	
	Percentage of total	Times over once	Man-hrs. per acre over once		Percentage of total	Times over once	Man-hrs. per acre over once		Percentage of total	Times over once	Man-hrs. per acre over once	
	Pct.	No.	Hrs.	Hrs.	Pct.	No.	Hrs.	Hrs.	Pct.	No.	Hrs.	Hrs.
Spread manure	-	-	-	-	8	1.0	1.92	0.15	17	1.0	5.32	0.90
Disk before plowing	9	1.0	0.36	0.03	13	1.0	.36	.05	-	-	-	-
Plow	100	1.0	1.05	1.05	99	1.0	1.09	1.08	100	1.0	1.49	1.49
Disk	77	2.1	.36	.58	40	2.2	.35	.31	60	2.0	.65	.78
Disk and harrow	23	2.1	.41	.20	63	2.2	.37	.51	51	1.6	.60	.49
Disk and cultipack	8	1.7	.38	.05	9	1.4	.31	.04	5	2.0	.56	.06
Spiketooth harrow	33	1.1	.20	.07	17	1.1	.28	.05	10	1.2	.59	.07
Springtooth harrow	28	1.4	.27	.11	7	1.0	.23	.02	19	1.1	.35	.07
Cultipack or cultimulch	19	1.1	.35	.07	7	1.0	.31	.02	-	-	-	-
Plant	61	1.0	.49	.30	73	1.0	.48	.35	86	1.0	.75	.64
Plant and fertilize	39	1.0	.50	.20	27	1.0	.54	.15	14	1.0	.63	.09
Spiketooth harrow	25	1.0	.19	.05	-	-	-	-	4	1.3	1.06	.06
Rotary hoe 4/	47	1.6	.27	.20	88	1.4	.26	.32	70	1.3	.42	.38
Cultivate	100	2.5	.48	1.20	100	2.5	.44	1.10	100	2.4	.79	1.90
Other operations				.02				.01				-
Total preharvest				4.13				4.16				6.93
Machine-pick and crib	96	1.0	2.07	1.99	95	1.0	2.24	2.13	77	1.0	3.20	2.46
Hand-pick and crib	4	1.0	7.75	.31	5	1.0	8.30	.42	17	1.0	7.35	1.25
Cut, shock, husk, and crib	-	-	-	-	-	-	-	-	2	1.0	11.33	.23
Cut, shock, shred, and crib	-	-	-	-	-	-	-	-	4	1.0	20.38	.82
Total harvest				2.30				2.55				4.76
Total man-hours				6.43				6.71				11.69
				Power-hours				Power-hours				Power-hours
Total tractor-hours				5.60				5.77				7.83
Total truck-hours				.18				.18				.05
Total horse-hours				.36				.48				5.26

1/ From 31 records with an average yield of 51 bushels per acre. 2/ From 53 records with an average yield of 55 bushels per acre. 3/ From 21 records with an average yield of 48 bushels per acre.

4/ Includes rotary hoe and cultipack as one operation.

Winter Wheat

When horses were the main source of farm power, much of the wheat in parts of the State was seeded with small one-horse drills that ran between the rows of standing corn. This method of putting in wheat has largely disappeared, even though mechanical power units that can do the job are available. These machines were used to seed the wheat between the rows of standing corn on a small percentage of the acreage in both the Central-Southwestern area and the Southeastern area (table 4). An additional percentage of wheat in each area followed corn in the rotation but it was seeded after the corn was harvested. In preparing the corn land for wheat, most of it was plowed. Most of the remaining wheat followed soybeans in the rotation. There was a tendency to disk rather than plow the land that had been in soybeans, the disking often being a part of the drilling operation. Man-hours used per acre up to harvest totaled 1.8 in the Northern area, 1.2 in the Central-Southwestern area, and 1.7 in the Southeastern area.

Five- and 6-foot combines were used to harvest most of the wheat, although use of combines ranging up to the 10-foot size was reported. The binder-thresh method was used only in the Southeastern area, and there on only 18 percent of the acreage. This was sufficient, however, to result in almost twice the number of man-hours for harvesting the grain as compared to the two other areas. But the straw on the acreage bound and threshed was collected. If the straw was removed from the acreage harvested with combines extra operations were necessary.

There were several reasons for removing the straw. It may have been wanted for use or for sale. If hay had been seeded as a companion crop, removal may have been desired to prevent the straw from becoming mixed with the hay or to improve the stand and growth of the legume-grass seeding. Baling with a pick-up baler, sometimes preceded by raking or by mowing and raking, was the method used in removing the straw. It took from 3 to 3 1/2 man-hours to mow, rake, bale, and store the bales from an acre. As the straw was removed from only about two-fifths of the acreage, an average of a little more than an hour per acre was required for straw.

Total labor requirements per acre of wheat were 4.3 man-hours in the Northern area, 3.8 man-hours in the Central-Southwestern area, and 5.7 man-hours in the Southeastern area. As wheat production calls for little hand work, the sum of the power hours nearly equaled that of the man-hours.

Table 4.- Winter wheat: Man- and power-hours per acre in indicated areas, Indiana, 1950

Operation	Northern 1/				Central-Southwestern 2/				Southeastern 3/			
	Acreage covered		Man-hrs. per acre		Acreage covered		Man-hrs. per acre		Acreage covered		Man-hrs. per acre	
	Percentage of total	Times over	Man-hrs per acre once over	Man-hrs per acre for total acreage	Percentage of total	Times over	Man-hrs per acre once over	Man-hrs per acre for total acreage	Percentage of total	Times over	Man-hrs per acre once over	Man-hrs per acre for total acreage
	Pct.	No.	Hrs.	Hrs.	Pct.	No.	Hrs.	Hrs.	Pct.	No.	Hrs.	Hrs.
Disk 4/	61	1.9	0.33	0.38	91	1.6	0.39	0.57	80	2.2	0.40	0.70
Plow	39	1.0	1.02	.40	7	1.0	1.08	.08	17	1.0	1.16	.20
Disk after plowing 4/	36	2.0	.39	.28	2	1.2	.34	.01	9	2.3	.45	.09
Harrow	21	1.3	.55	.15	1	1.0	.37	-	11	1.5	.47	.08
Cultipack	22	1.2	.50	.13	-	-	-	-	-	-	-	-
Drill in corn	-	-	-	-	2	1.0	1.46	.03	3	1.0	1.92	.06
Drill and fertilize 5/	100	1.0	.43	.43	98	1.0	.55	.54	97	1.0	.59	.57
Top dress	5	1.0	.52	.03	3	1.0	.35	.01	-	-	-	-
Total preharvest				1.80				1.24				1.70
Combine 6/	100	1.0	1.39	1.39	100	1.0	1.35	1.35	82	1.0	1.48	1.21
Bind	-	-	-	-	-	-	-	-	18	1.0	1.20	.22
Shock	-	-	-	-	-	-	-	-	18	1.0	1.87	.34
Thresh 6/	-	-	-	-	-	-	-	-	18	1.0	4.88	.88
Total harvest (grain)				1.39				1.35				2.65
Mow stubble	6	1.0	.30	.02	27	1.0	.41	.11	23	1.0	.48	.11
Rake	16	1.0	.33	.05	31	1.0	.39	.12	42	1.0	.39	.16
Bale and store bales	45	1.0	2.36	1.06	37	1.0	2.73	1.01	42	1.0	2.53	1.06
Total harvest (straw)				1.13				1.24				1.33
Total man-hours				4.32				3.83				5.68
			Power-hours				Power-hours					Power-hours
Total tractor-hours				3.41				2.89				3.25
Total truck-hours				.29				.42				.62
Total horse-hours				-				-				1.11

1/ From 23 records with average yields of 24 bushels of grain and 0.75 tons of straw per acre. 2/ From 41 records with average yields of 22 bushels of grain and 0.86 tons of straw per acre. 3/ From 19 records with average yields of 20 bushels of grain and 0.75 tons of straw per acre. 4/ Includes disk and harrow, and disk and cultipack as one operation. 5/ Includes disk, drill, and fertilize as one operation. 6/ Includes hauling grain.

Oats

Different combinations of tillage operations were performed in preparing land for oats. More than half of the land in each area was disked one or more times (table 5). The remainder was plowed, chiefly with 2-bottom moldboard plows which took from 0.92 to 1.27 hours per acre in the three areas. The plowed land was usually worked down with disks, although some was harrowed rather than disked.

The extent of work done in preparing the land depended partly upon the method of seeding and upon whether hay was seeded as a companion crop. A more thorough job was done when hay was seeded and less was done when drilling was combined with disking. Practically all the seed broadcast with endgate seeders and by hand was covered by disking. The remainder of the acreage seeded by broadcasting was harrowed. Some of the drilled oats also were harrowed after seeding. Labor requirements up to harvest were 1.6, 1.4 and 2.0 man-hours per acre in the Northern, Central-Southwestern, and Southeastern areas, respectively.

As was true for wheat, oats were harvested by binding and threshing only in the Southeastern area, and there on only a small part of the acreage. In the Central-Southwestern area, a tenth of the oats was windrowed, and combined from the windrow. Small-grain binders with the bundle-making mechanism removed were used for windrowing. In some years part of the oats crop is used for hay, particularly in the southern part of the State, but oats used for hay was omitted in this study. Labor requirements for harvest were highest in the Southeastern area (2.3 man-hours) because more time was required to combine an acre and because the binder-thresher method was used in harvesting some of the oats.

An average of an hour to an hour and a quarter an acre was spent in removing straw from a part of the acreage harvested with combines. Baling the straw and storing the bales took most of the time, but some of the stubble was raked or mowed and raked before baling. The straw was removed from a third to two-fifths of the acreage combined.

Total man-hours per acre ranged from 3.7 to 5.5, and tractor-hours from 3.0 to 4.0 in the different areas. Around three-tenths of a truck-hour per acre were used in all areas. Use of horses was reported only in the Southeastern area where they were used an average of a little less than an hour an acre. They pulled some of the bundle wagons used in threshing and were used on some of the operations in removing straw.

Table 5.- Oats: Man- and power-hours per acre in indicated areas, Indiana, 1950

Operation	Northern 1/				Central-Southwestern 2/				Southeastern 3/			
	Acreage covered		Man-hrs. per acre for total acreage		Acreage covered		Man-hrs. per acre for total acreage		Acreage covered		Man-hrs. per acre for total acreage	
	Percentage of total	Times over once over	Man-hrs. per acre		Percentage of total	Times over once over	Man-hrs. per acre		Percentage of total	Times over once over	Man-hrs. per acre	
	Pct.	No.	Hrs.	Hrs.	Pct.	No.	Hrs.	Hrs.	Pct.	No.	Hrs.	Hrs.
Disk before plowing	-	-	-	-	7	1.0	0.35	0.02	-	-	-	-
Plow	49	1.0	0.92	0.45	21	1.0	1.27	.27	39	1.0	1.12	0.44
Disk 4/	92	1.9	.38	.66	98	1.7	.34	.57	100	2.4	.42	1.01
Harrow 5/	25	1.0	.24	.06	-	-	-	-	-	-	-	-
Disk and drill 6/	10	1.0	.50	.05	15	1.0	.59	.09	-	-	-	-
Drill 6/	75	1.0	.42	.32	60	1.0	.40	.24	100	1.0	.51	.51
Seed with endgate seeder	13	1.0	.16	.02	25	1.0	.27	.07	-	-	-	-
Broadcast by hand	2	1.0	.27	.01	-	-	-	-	-	-	-	-
Disk after seeding	15	1.0	.32	.05	23	1.0	.33	.08	-	-	-	-
Harrow after seeding	6	1.0	.34	.02	15	1.0	.20	.03	-	-	-	-
Total preharvest				1.64				1.37				1.96
Bind	-	-	-	-	-	-	-	-	8	1.0	1.58	.13
Shock	-	-	-	-	-	-	-	-	8	1.0	1.80	.14
Thresh 7/	-	-	-	-	-	-	-	-	8	1.0	3.84	.31
Windrow	-	-	-	-	10	1.0	.56	.06	-	-	-	-
Combine from windrow 7/	-	-	-	-	10	1.0	1.33	.13	-	-	-	-
Combine standing grain 7/	100	1.0	1.26	1.26	90	1.0	1.22	1.10	92	1.0	1.90	1.75
Total harvest (grain)				1.26				1.29				2.33
Mow stubble	33	1.0	.38	.13	16	1.0	.37	.06	28	1.0	.55	.15
Rake	36	1.0	.44	.16	21	1.0	.37	.08	36	1.0	.56	.20
Pick-up bale and store	36	1.0	2.26	.81	32	1.0	2.75	.88	36	1.0	2.50	.90
Total harvest (straw)				1.10				1.02				1.25
Total man-hours				4.00				3.68				5.54
				Power Hours				Power Hours				Power Hours
Total tractor-hours				3.20				2.96				3.99
Total truck-hours				.28				.30				.34
Total horse-hours				-				-				.85

1/ From 24 records with average yields of 39 bushels of grain and 0.75 tons of straw per acre. 2/ From 30 records with average yields of 39 bushels of grain and 0.88 tons of straw per acre. 3/ From 9 records with average yields of 35 bushels of grain and 0.75 tons of straw per acre. 4/ Includes disk and cultipack and disk and harrow as one operation. 5/ Includes both spring-tooth and spike-tooth harrows. 6/ Includes spreading fertilizer in some instances. 7/ Includes hauling grain.

Soybeans

Two methods were used in growing soybeans in the State. One method consisted of planting them as a row crop and the other of drilling them as a close-grown crop. More time was required when they were handled as a row crop. The higher the proportion of the acreage in the different areas grown in rows the greater the man-hours for preharvest. This was not a direct relationship, however, as many other factors were involved. Less seed is needed when the beans are planted in rows and usually a higher yield is produced which offsets the extra preharvest labor. Practically all soybeans were planted in rows in the Northern area, 73 percent in the Central-Southwestern area, and 41 percent in the Southeastern area (table 6). Of those grown in rows, some were harrowed or rotary-hoed after planting and all were cultivated with row-crop cultivators. The exact percentage could not be ascertained from the records, but a minimum of 46 percent of those close-grown were gone over with rotary hoes from one to one and a half times.

Preparing land for soybeans took about 2 man-hours per acre. Most of the land was plowed and from 12 to 52 percent of the land in the different areas was disked before plowing. Nearly all was disked approximately twice after plowing and some was also gone over with harrows and cultipackers. Planting or drilling and the various cultivations took from one and a quarter to nearly 2 hours which, with the land preparation work, resulted in preharvest requirements of from 3.3 to 3.7 man-hours per acre.

Soybeans were all harvested with combines. Combining and hauling the beans took from 1.3 to about 2 man-hours per acre. Both trucks and wagons pulled by tractors were used to haul soybeans.

Total labor requirements averaged around 5 man-hours per acre in each area. In the Northern area the sum of tractor-hours and truck-hours equals man-hours but in the other areas an extra man was sometimes used in harvesting. Also, a little hand hoeing was done in the Central-Southwestern area. Use of horses in producing soybeans was not reported.

Table 6.- Soybeans: Man- and power-hours per acre in indicated areas, Indiana, 1950

Operation	Northern 1/				Central-Southwestern 2/				Southeastern 3/			
	Acreage covered		Man-hrs. per acre for total acreage		Acreage covered		Man-hrs. per acre for total acreage		Acreage covered		Man-hrs. per acre for total acreage	
	Percentage of total	Times over	Man-hrs. per acre once over		Percentage of total	Times over	Man-hrs. per acre once over		Percentage of total	Times over	Man-hrs. per acre once over	
	Pct.	No.	Hrs.	Hrs.	Pct.	No.	Hrs.	Hrs.	Pct.	No.	Hrs.	Hrs.
Spread manure	-	-	-	-	1	1.0	2.68	0.03	-	-	-	-
Disk before plowing	12	1.0	0.34	0.04	52	1.0	.35	.18	26	1.0	0.47	0.12
Plow 4/	96	1.0	.99	.95	96	1.0	1.04	1.00	92	1.0	1.21	1.11
Disk 5/	94	1.9	.34	.61	99	2.3	.36	.82	100	2.0	.42	.84
Spike-tooth harrow	30	1.2	.17	.06	14	1.0	.19	.03	-	-	-	-
Spring-tooth harrow	24	1.8	.26	.11	-	-	-	-	-	-	-	-
Cultipack	13	1.2	.32	.05	5	1.0	.29	.01	-	-	-	-
Plant 6/	97	1.0	.45	.44	73	1.0	.42	.31	41	1.0	.55	.23
Drill 7/	3	1.0	.41	.01	27	1.0	.48	.13	59	1.0	.49	.29
Harrow	28	1.1	.20	.06	5	1.0	.14	.01	-	-	-	-
Rotary hoe	59	1.5	.25	.22	79	1.4	.24	.27	48	1.0	.34	.16
Cultivate	97	2.4	.48	1.12	73	1.9	.48	.67	41	2.0	.69	.57
Hoe	-	-	-	-	1	1.0	2.50	.02	-	-	-	-
Total preharvest				3.67				3.48				3.32
Combine 8/	100	1.0	1.46	1.46	100	1.0	1.30	1.30	100	1.0	2.05	2.05
Total harvest				1.46				1.30				2.05
Total man-hours				5.13				4.78				5.37
				Power-hours				Power-hours				Power-hours
Total tractor-hours				4.88				4.44				4.62
Total truck-hours				.25				.31				.50

1/ From 25 records with an average yield of 23 bushels per acre. 2/ From 52 records with an average yield of 23 bushels per acre. 3/ From 9 records with an average yield of 17 bushels per acre. 4/ Includes plow and harrow as one operation. 5/ Includes disk and harrow and/or cultipack as one operation. 6/ Includes plant and fertilize as one operation. 7/ Includes drill and fertilize as one operation. 8/ Includes hauling grain.

Alfalfa Hay

Although pure stands of alfalfa are grown in the State, it is generally grown in a mixture with other legumes and grasses. The information in table 8 applies to the pure stands and to those mixtures that contain a predominance of alfalfa. Seventy percent or more of the alfalfa in each area was established with a companion crop. In the Northern and Central-Southwestern areas, about half of the alfalfa established with a companion crop was seeded in a separate operation after the companion crop had been seeded. The other half was seeded in the same operation with a grass seeder attached to the small grain drill. When this combined seeding was done the labor and power involved in land preparation and seeding was charged entirely to the small grain. When alfalfa was seeded on an established small grain companion crop, only the alfalfa seeding and the extra operations performed because of the alfalfa were charged to it.

When alfalfa was seeded alone it took from 2.7 to over 4 man-hours per acre in the different areas. This method of establishing alfalfa was followed on 7, 30 and 19 percent of the acreage in the Northern, Central-Southwestern, and Southeastern areas, respectively. Man-hour requirements per acre for all methods of seeding averaged from 0.5 to 1.3 in the different parts of the State. When converted to an annual basis these requirements were from 0.2 to 0.3 man-hours per acre.

In summarizing the requirements for harvest, all methods were combined into three main methods - putting up loose, pick-up baling, and pick-up chopping. Within each of these three main methods, were many different combinations of size of crews, place of storage, kind and size of machines and power units used particularly in putting up loose hay.

Most of the alfalfa was cut three times, but a little was cut only twice. Seven-foot tractor mowers were extensively used. These machines mow around 3 acres an hour. Raking was done with side-delivery rakes. Labor requirements for moving hay from windrow to storage are more meaningful on a per ton basis (table 7).

Table 7.- Alfalfa hay: Man-hours per ton for various methods of harvest in indicated areas, Indiana, 1950

Method of harvest	Northern	Central-Southwestern	Southeastern
Store loose hay	3.36	3.22	3.31
Pick-up bale and store	2.95	2.94	2.92
Pick-up chop and store	2.00	2.13	2.01

Areas varied little in labor requirements per ton for each method. Total man-hours for harvest were greater in the Southeastern area than in other parts of the State. In this area a greater percentage of the hay was put up loose and this takes more hours per acre or per ton. An additional contributing factor to the greater number of man-hours for harvest in this area was the use of horses. Around a seventh of the acreage was cut with 5-foot mowers pulled with horses. Horses were also used for some of the raking and for hauling some of both the loose and baled hay in this area. Use of horses was not reported in the other areas.

Table 8.- Alfalfa hay: Man- and power-hours per acre in indicated areas, Indiana, 1950

Operation	Northern 1/				Central-Southwestern 2/				Southeastern 3/			
	Acreage covered		Man-hrs.		Acreage covered		Man-hrs.		Acreage covered		Man-hrs.	
	Percentage of total	Times over	Man-hrs. per acre once over	per acre for total acreage	Percentage of total	Times over	Man-hrs. per acre once over	per acre for total acreage	Percentage of total	Times over	Man-hrs. per acre once over	per acre for total acreage
	Pct.	No.	Hrs.	Hrs.	Pct.	No.	Hrs.	Hrs.	Pct.	No.	Hrs.	Hrs.
Seeded alone	(7)				(30)				(19)			
Plow	5	1.0	1.16	0.06	24	1.0	1.08	0.26	19	1.0	1.14	0.22
Disk	7	4.5	.42	.13	30	3.0	.32	.29	19	3.3	.37	.23
Harrow or cultipack	7	2.5	.40	.07	13	1.4	.34	.06	-	-	-	-
Fertilize	-	-	-	-	4	1.0	.84	.03	12	1.0	.78	.09
Drill seed	5	1.0	.83	.04	11	1.0	.63	.07	9	1.0	.48	.04
Seed by hand 4/	2	1.0	1.00	.02	17	1.0	.37	.06	10	1.0	.38	.04
Seed with endgate seeder	-	-	-	-	2	1.0	.29	.01	-	-	-	-
Harrow or cultipack	-	-	-	-	10	1.2	.27	.03	10	1.0	.25	.02
Seeded on companion crop	(45)				(35)				(75)			
Drill seed	-	-	-	-	11	1.0	.51	.06	42	1.0	.70	.29
Seed by hand 4/	26	1.0	.65	.17	13	1.0	.31	.04	30	1.0	.75	.22
Seed with endgate seeder	19	1.0	.14	.03	11	1.0	.24	.03	3	1.0	.33	.01
Harrow or cultipack	-	-	-	-	-	-	-	-	45	1.0	.38	.17
Seeded with companion crop	(48)				(35)				(6)			
Total seeding	(100)			.52	(100)			.94	(100)			1.33
Total seeding (annual basis)				.20				.28				.29
Annual care - fertilize				-				.15				.30
Total preharvest				.20				.43				.59
Harvest												
Mow	100	2.8	.36	1.01	100	2.9	.39	1.13	100	3.0	.52	1.56
Rake and rerake	100	3.1	.36	1.12	100	3.0	.37	1.11	100	3.1	.45	1.40
Store loose hay	10	2.8	3.12	.87	10	2.9	3.00	.87	26	3.0	3.20	2.50
Pick-up bale and store	85	2.8	2.74	6.52	82	2.9	2.74	6.52	70	3.0	2.82	5.92
Pick-up chop and store	5	2.8	1.86	.26	8	2.9	1.98	.46	4	3.0	1.94	.23
Total harvest				9.78				10.09				11.61
Total man-hours				9.98				10.52				12.20
			Power-hours				Power-hours				Power-hours	
Total tractor-hours				5.34				6.23				6.19
Total truck-hours				-				1.62				.30
Total horse-hours				-				-				1.31

1/ 26 records, av. yield 2.6 T., length of stand 2.6 yrs. 2/ 34 records, av. yield 2.7 T, length of stand 3.3 yrs.
3/ 11 records, av. yield 2.9 T., length of stand 4.5 yrs. 4/ Includes broadcast by hand and with hand seeder.

Clover and Timothy Hay

In Indiana in recent years, clover and timothy hay has been harvested from about twice as many acres as alfalfa. Clover and timothy includes pure stands and the mixtures that contain a prevalence of timothy or one or more of the clovers.

Requirements for establishing stands of clover and timothy hay were low as all of it was seeded with a companion crop (table 10). A little more than half of it in the Northern and Central-Southwestern areas and almost all of it in the Southeastern area were put in as a separate operation after the companion crop had been seeded. Endgate seeders that covered 5 to 6 acres an hour were used more than any other kind of seeder in the northern areas. Almost all of the clover and timothy in the Southeastern area was broadcast by hand or seeded with hand seeders.

In the Southeastern area about the same percentage of clover and timothy hay as of alfalfa was baled with pick-up balers. In the northern areas a greater percentage was baled and less was put up loose or chopped with pick-up choppers. The man-hours used to put up a ton of clover and timothy hay from windrow to storage by each method in the three areas are shown in table 9.

Table 9.- Clover and timothy hay: Man-hours per ton for various methods of harvest in indicated areas, Indiana, 1950

Method of harvest	Northern	Central-Southwestern	South-eastern
	Hours	Hours	Hours
Store loose hay	3.11	3.08	3.52
Pick-up bale and store	2.77	2.74	3.22
Pick-up chop and store	1.84	1.91	-

The most efficient method so far as labor is concerned, the pick-up chopping method was used the least. This method, however, takes a large investment in equipment. Putting up loose hay took about a tenth more time per ton than the pick-up baler method.

Man-hours for harvest and also total hours, were lowest in the Central-Southwestern area and highest in the Southeastern area. Not only was more time used in this area for preharvest work and after the hay was in windrows, but more time was also used for mowing and raking. Total tractor-hours were lowest in this area because horses were used in part, on a number of the operations.

Table 10.- Clover and timothy hay: Man- and power-hours per acre in indicated areas, Indiana, 1950 1/

Operation	Northern 2/				Central-Southwestern 3/				Southeastern 4/			
	Acreage covered		Man-hrs. per acre once over	Man-hrs. per acre for total acreage	Acreage covered		Man-hrs. per acre once over	Man-hrs. per acre for total acreage	Acreage covered		Man-hrs. per acre once over	Man-hrs. per acre for total acreage
	Percentage of total	Times over			Percentage of total	Times over			Percentage of total	Times over		
	Pct.	No.	Hrs.	Hrs.	Pct.	No.	Hrs.	Hrs.	Pct.	No.	Hrs.	Hrs.
Seeded on companion crop 5/	(51)				(55)				(98)			
Drill seed 6/	5	1.0	0.67	0.03	2	1.0	0.50	0.01	-	-	-	-
Seed by hand 7/	18	1.0	.34	.06	15	1.0	.36	.05	96	1.0	0.47	0.45
Seed with endgate seeder	28	1.0	.19	.05	38	1.0	.19	.07	2	1.0	.17	-
Seeded with companion crop 8/	(49)				(45)				(2)			
Total preharvest	(100)			.14	(100)			.13	(100)			.45
Harvest:												
Mow	100	1.0	.40	.40	100	1.0	.35	.35	100	1.0	.60	.60
Rake and rerake	100	1.1	.38	.42	100	1.1	.34	.37	100	1.0	.41	.41
Store loose hay	6	1.0	4.35	.26	9	1.0	4.31	.39	31	1.0	5.28	1.64
Pick-up bale and store	92	1.0	3.88	3.57	87	1.0	3.83	3.33	69	1.0	4.83	3.33
Pick-up chop and store	2	1.0	2.58	.05	4	1.0	2.68	.11	--	-	-	-
Total harvest				4.70				4.55				5.98
Total man-hours				4.84				4.68				6.43
			Power-hours				Power-hours				Power-hours	
Total tractor hours				2.63				2.29				2.15
Total truck hours				.06				.10				-
Total horse hours				-				-				1.19

1/ Average hours per acre are on a yearly seeding basis; if the stand is left for more than 1 year the total preharvest figures may be divided by the number of years the stand is left to determine the annual hours.

2/ From 28 records with an average yield of 1.4 tons per acre. 3/ From 38 records with an average yield of 1.4 tons per acre. 4/ From 10 records with an average yield of 1.5 tons per acre. 5/ Seeded on the growing small-grain companion crop. 6/ Includes drill and fertilize as one operation. 7/ Includes broadcast by hand and with hand seeder. 8/ Seeded with the small-grain companion crop as one operation; no labor charged to clover and timothy.

Lespedeza Hay

As lespedeza is grown primarily in the southern part of the State, records of requirements for it were obtained only in the southern part of the Central-Southwestern area and in the Southeastern area and all were combined for summary. All the lespedeza was seeded with a small-grain companion crop and was put in after the small grain had been drilled (table 11). Eighty-three percent of it was broadcast by hand or with hand seeders and the remaining 17 percent with endgate seeders. Preharvest requirements were less than a man-hour per acre.

More of the lespedeza than of any other hay was put up loose. A little over half of the lespedeza hay was put up by this method. Moving loose hay from windrow to storage took 3.4 man-hours per ton and pick-up baling and storing the bales took 2.9 man-hours per ton.

Horses were used for some of the mowing, raking and mauling, but tractors were the most common source of power. Horse-hours averaged 1.2 per acre and tractor-hours 1.8 per acre.

Table 11.- Lespedeza hay: Man- and power-hours per acre in the Central-Southwestern and Southeastern areas, Indiana, 1950 1/

Operation	Acreage covered: Percentage of total	Times over	Man-hrs. per acre: once over	Man-hrs. per acre for total acreage
	Pct.	No.	Hrs.	Hrs.
Seeded on companion crop 2/	(100)			
Seed by hand 3/	83	1.0	0.59	0.49
Seed with endgate seeder	17	1.0	.16	.03
Total preharvest				.52
Harvest				
Mow	100	1.0	.56	.56
Rake	100	1.0	.50	.50
Store loose hay	53	1.0	4.11	2.18
Pick-up bale and store	47	1.0	3.48	1.64
Total harvest				4.88
Total man-hours				5.40
				Power-hours
Total tractor-hours				1.79
Total truck-hours				.07
Total horse-hours				1.20

1/ From 14 records with an average yield of 1.2 tons per acre.
2/ Seeded on the growing small-grain companion crop.
3/ Includes broadcast by hand and with hand seeder.

Barley

Records of labor and power used in producing barley were obtained only in the Southeastern area. In 1949, according to the Bureau of the Census, 63 percent of the barley in the State was grown in this area. Less of the oats (fewer than 10 percent) were raised there.

Labor requirements for preharvest work on barley were 3.4 man-hours per acre (table 12). Two-thirds of the time was spent in land preparation, which consisted of plowing 60 percent of the land and disking all of it an average of 2.2 times. Most of the other third was for seeding, which was done with drills.

Combining, which took 2 hours per acre wherever done, including hauling the grain, was the method of harvest on 73 percent of the barley. The rest was bound, shocked, and threshed. Straw was baled from the windrow on 27 percent of the acreage. Labor requirements per acre for harvest, including the 0.79 man-hours for straw, constituted 54 percent of the total. Horse-hours averaged a little more than 1 per acre. Use of horses was reported for drilling, cultipacking, hauling the bundle and grain wagons, and hauling straw.

Table 12.- Barley: Man- and power-hours per acre in the Southeastern area, Indiana, 1950 1/

Operation	Acreage covered: Percentage of total	Acreage covered: Times over	Man-hrs. per acre: once over	Man-hrs. per acre for total acreage
	Pct.	No.	Hrs.	Hrs.
Plow	60	1.0	1.52	0.91
Disk 2/	100	2.2	.64	1.41
Drill 3/	100	1.0	.84	.84
Other operations				.26
Total preharvest				3.42
Combine 4/	73	1.0	2.01	1.47
Bind	27	1.0	1.10	.30
Shock	27	1.0	1.70	.46
Thresh 4/	27	1.0	3.68	.99
Total harvest (grain)				3.22
Mow stubble	19	1.0	.44	.08
Rake	21	1.0	.44	.09
Pick-up bale and store	27	1.0	2.30	.62
Total harvest (straw)				.79
Total man-hours				7.43
				Power-hours
Total tractor-hours				4.42
Total truck-hours				.33
Total horse-hours				1.04

1/ From 11 records with average yields of 31 bushels of grain and 0.67 tons of straw per acre.

2/ Includes disk and harrow and disk and cultipack as one operation. 3/ Includes drilling and spreading fertilizer as one operation. 4/ Includes hauling grain.

Tomatoes for Processing

More tomatoes for processing are produced in Indiana than in any other eastern State. An average of almost a half million tons were harvested annually during the 1940's. Around a million 10-hour days of farm work were used each year in raising, harvesting, and marketing these tomatoes.

In 1950, preparing land for tomatoes took around 3 hours per acre in all parts of the State (table 13). Land preparation consisted of plowing and working the land into a firm seedbed with disks and harrows. Three-fifths of the tomatoes were established by direct seeding in the Northern area and 48 percent in the Central-Southwestern area. Plants were used on the remainder of the acreage. All of them were set by machine. As the tomatoes seeded directly in the field were thinned with a hoe or blocked, which took from 12 to 16 hours an acre, this method did not save labor compared with setting the plants with a transplanter. But the amount of labor used is not the only consideration in determining whether to plant seed or to set plants. Other factors, such as the cost of seed and plants, are also considered.

Fertilizer was applied in various ways and at various times except that no side dressing was reported. The fertilizer was applied as a separate operation and in connection with other operations such as plowing, disking, planting, marking, and setting plants.

Labor requirements up to harvest were greatest in the Northern area (25.2 man-hours per acre) principally because a large percentage of the acreage was hoed, which took more than 9 hours an acre. Hoeing was done on 35 percent of the acreage in the Central-Southwestern area and preharvest requirements totaled approximately 21 hours per acre.

It took from 8 to 10 man-hours in the two areas to pick a ton of tomatoes or around 65 hours an acre. Thirteen man-hours were required to haul the tomatoes produced on an acre in the Central-Southwestern area and 20 man-hours were required in the Northern area. Both the yield and the hauling distance influenced the time required for hauling. Trucks were chiefly used for hauling. Tractors were used for some of the short hauls in the Central-Southwestern area and total tractor-hours per acre were highest in this area. Truck-hours were highest in the Northern area where some of the tomatoes were hauled a considerable distance for processing.

Table 13.- Tomatoes for processing: Man- and power-hours per acre in indicated areas, Indiana, 1950

Operation	Northern 1/				Central-Southwestern 2/			
	Acreage covered		Man-hours per acre once over	Man-hours per acre for total acreage	Acreage covered		Man-hours per acre once over	Man-hours per acre for total acreage
	Percentage of total	Times over			Percentage of total	Times over		
	Percent	Number	Hours	Hours	Percent	Number	Hours	Hours
Spread manure	-	-	-	-	28	1.0	2.64	0.74
Disk before plowing	-	-	-	-	20	1.0	.35	.07
Plow	100	1.0	1.09	1.09	100	1.0	1.12	1.12
Disk	100	2.6	.39	1.01	100	2.9	.37	1.07
Spike-tooth harrow	28	1.2	.46	.15	25	1.2	.22	.07
Spring-tooth harrow	31	2.0	.41	.25	-	-	-	-
Fertilize	62	1.0	.62	.38	48	1.0	.52	.25
Plant seed	60	1.0	1.00	.60	48	1.0	.80	.38
Set plants, machine	40	1.0	4.76	1.90	52	1.0	7.09	3.69
Reset	16	1.0	1.62	.26	9	1.0	1.92	.17
Rotary hoe	15	1.5	1.12	.25	44	1.3	.29	.17
Block and thin	60	1.0	12.61	7.57	48	1.0	13.98	6.71
Hoe	90	1.1	9.22	9.13	35	1.0	10.36	3.63
Cultivate	100	3.3	.71	2.34	100	3.2	.71	2.27
Dust or spray	48	1.2	.47	.27	30	3.0	.28	.25
Worm	-	-	-	-	6	1.0	5.71	.34
Total preharvest				25.20				20.93
Open drives	15	1.0	1.75	.26	16	1.0	1.03	.16
Pick	100	6.6	10.44	68.90	100	6.8	9.55	64.94
Haul	100	6.6	3.09	20.39	100	6.8	1.94	13.19
Total harvest				89.55				78.29
Total man-hours				114.75				99.22
				Power-hours				Power-hours
Total tractor-hours				6.94				12.78
Total truck-hours				13.07				6.53

1/ From 13 records with an average yield of 7.4 tons per acre.

2/ From 16 records with an average yield of 7.8 tons per acre.

Sweet Corn for Processing

According to the 1950 United States Census there were 7 counties in Indiana in which more than 1,000 acres of sweet corn for processing were produced. In this survey, labor and power requirements for sweet corn production were obtained in two of these counties and all questionnaires were combined for summarization.

As about the same operations are performed, growing sweet corn for processing does not differ materially from growing regular field corn. Of the preharvest work on sweet corn, about a tenth was for planting and the remainder was almost evenly divided between land preparation and cultivating (table 14).

Mechanical pickers were used to harvest 45 percent of the sweet corn. When this method was used, it took 2.4 man-hours to pick and deliver an acre of corn and saved around 10 man-hours per acre compared with hand picking.

Total man-hours for sweet corn averaged slightly less than 13 per acre. Power requirements per acre were 5 tractor-hours, 2.9 truck-hours, and 0.6 horse-hours.

Table 14.- Sweet corn for processing: Man- and power-hours per acre in the Central-Southwestern and Southeastern areas, Indiana, 1950 1/

Operation	Acreage covered: Percentage of total	Times over	Man-hrs. per acre: once over	Man-hrs. per acre for total acreage
	Pct.	No.	Hrs.	Hrs.
Disk before plowing	9	1.5	0.27	0.04
Plow 2/	100	1.0	.90	.90
Disk 3/	94	2.1	.36	.71
Spike-tooth harrow	24	1.0	.31	.07
Plant 4/	100	1.0	.43	.43
Spike-tooth harrow	17	1.0	.27	.05
Rotary hoe	48	1.4	.23	.15
Cultivate	100	3.0	.60	1.80
Other operations				.82
Total preharvest				4.97
Hand-pick and haul	55	1.0	12.21	6.72
Machine-pick and haul	45	1.0	2.38	1.07
Total harvest				7.79
Total man-hours				12.76
				Power-hours
Total tractor-hours				4.97
Total truck-hours				2.90
Total horse-hours				.64

1/ From 19 records with an average yield of 2.2 tons per acre. 2/ Includes plow and harrow as one operation.
3/ Includes disk and harrow as one operation.
4/ Includes planting and fertilizing as one operation.

Potatoes

Although produced in all parts of the State, commercial production of potatoes is fairly well concentrated in the northern part. As they are harvested in the fall, they are classified as late potatoes.

In 1950, requirements for preharvest work totaled 30.9 man-hours per acre in the Northern area (table 15). Eight percent of the preharvest work was for land preparation, 25 percent for cutting seed and planting, 12 percent for cultivating, 8 percent for spraying and dusting, and 47 percent for hoeing.

Before digging, the vines on 10 percent of the acreage were killed mechanically or with chemicals. Both 1-row and 2-row diggers were used to remove the tubers from the ground. They were then picked up by hand, put into sacks, and hauled to storage. Workers picked up an average of 9.2 bushels per hour. Hauling the potatoes to storage and later to market, if stored on the farm, took an average of 8.32 hours per acre. Sorting, grading, and packing took 15 hours per acre and the entire harvesting job required 57 man-hours per acre.

In addition to the 88 man-hours required per acre to grow, harvest and market potatoes, tractor- truck- and horse-hours amounted to 13.97, 2.95, and 0.26 per acre, respectively. Use of trucks was limited to hauling the potatoes and horses were used to a minor extent for cultivating.

Table 15.- Potatoes: Man- and power-hours per acre in the Northern area, Indiana, 1950 1/

Operation	Acreage covered: Percentage of total	Acreage covered: Times over	Man-hrs. per acre: once over	Man-hrs. per acre for total acreage
	Pct.	No.	Hrs.	Hrs.
Plow	100	1.0	1.18	1.18
Disk 2/	100	1.8	.42	.76
Spike-tooth harrow 3/	60	2.0	.30	.36
Spring-tooth harrow	20	1.8	.38	.14
Cultipack	20	1.0	.32	.06
Cut seed	50	1.0	8.64	4.32
Plant and fertilize	100	1.0	3.32	3.32
Harrow or cultipack	60	2.5	.30	.45
Weeder	70	2.4	.25	.42
Cultivate 4/	100	4.3	.70	3.01
Spray or dust	100	6.2	.39	2.42
Hoe	-	-	-	14.46
Total preharvest				30.90
Kill vines (mechanical)	8	1.0	.50	.04
Kill vines (chemical)	2	1.0	.17	-
Dig	100	1.0	3.81	3.81
Pick	100	1.0	29.79	29.79
Haul 5/	100	1.0	8.32	8.32
Sorting, grading, packing	-	-	-	15.24
Total harvest				57.20
Total man-hours				88.10
				Power-hours
Total tractor-hours				13.97
Total truck-hours				2.95
Total horse-hours				.26

1/ From 10 records with an average yield of 275 bushels per acre. 2/ Includes disk and harrow and disk and float as one operation. 3/ Includes floating. 4/ Includes hilling. 5/ Includes hauling from the field to storage and hauling graded potatoes to market if stored on the farm.

Mint for Oil

During the 1940's almost half of the acreage of mint for oil harvested in the United States was in Indiana. Mint is grown only in the northern part of the State. Five of the records summarized in table 16 were obtained in Pulaski County and the other nine in Noble County.

Old settings of mint or meadow-mint required 27 man-hours per acre for preharvest work, or only about half as much as new settings or row-mint. The biggest job on both new and old settings of mint was hoeing. The land was thoroughly prepared for new settings of mint. It was plowed with 12 percent having received a prior disking, and worked down with disks and harrows. The land-preparation work took 2.3 hours per acre. Digging and preparing enough roots to plant an acre required 6.7 hours and setting them with a setter about the same amount of time. Fertilizer was spread as a part of the setting operation on most of the acreage, but it was done separately on 7 percent. After setting and fertilizing, most of the work consisted of hoeing and cultivating. Labor requirements for preharvest work on new settings of mint totaled 51.6 man-hours per acre.

Almost half of the mint that was left for harvest another year was plowed, chiefly in the fall. The following spring it was fertilized and cultivated with various implements. This work took a little more than 27 man-hours per acre. As the average life of a setting of mint was 2.7 years, 37 percent of the mint harvested was new settings and the remaining 63 percent was old settings. This means that average preharvest requirements were 36.3 man-hours per acre for old and new settings combined.

In harvesting mint it was first mowed and raked. Seven percent was cut with mowers equipped with a windrowing attachment. After drying in the windrow or shock it was loaded, usually on wagons pulled by tractors. Most of the mint was loaded with loaders but some of it was pitched by hand. After distillation the spent mint was usually spread back on the land with manure spreaders. The entire harvesting job required 14.46 man-hours per acre.

Total man-hours for growing and harvesting were 50.7 per acre. Average tractor- truck- and horse-hours per acre for these jobs were 12.1, 0.2, and 0.3, respectively.

Table 16.- Mint for oil: Man- and power-hours per acre in the Northern area, Indiana, 1950 1/

Operation	Acreage covered: Percentage of total	Acreage covered: Times over	Man-hrs. per acre: once over	Man-hrs. per acre: for total acreage
	Pct.	No.	Hrs.	Hrs.
New settings:				
Disk before plowing	12	1.0	0.43	0.05
Plow	100	1.0	1.05	1.05
Disk	98	1.8	.40	.71
Harrow 2/	88	1.9	.31	.52
Dig roots	100	1.0	6.74	6.74
Set plants 3/	100	1.0	6.93	6.93
Fertilize	7	1.0	.50	.04
Harrow	57	3.4	.24	.47
Rotary hoe	36	4.3	.26	.40
Weeder	64	2.2	.46	.65
Cultivate	100	4.2	.84	3.53
Hoe	100	1.6	19.04	30.46
Total				51.55
Old settings:				
Plow	43	1.0	.82	.35
Fertilize	92	1.0	.50	.46
Harrow 2/	43	3.2	.26	.36
Rotary hoe	29	3.5	.31	.32
Disk	86	2.0	.42	.72
Hoe	100	1.0	24.34	24.34
Weeder	71	2.8	.36	.72
Total				27.27
Total pre-harvest (annual basis)				36.26

Operation (continued)	Acreage covered: Percentage of total	Acreage covered: Times over	Man-hrs. per acre: once over	Man-hrs. per acre: for total acreage
	Pct.	No.	Hrs.	Hrs.
Harvest:				
Mow	93	1.0	1.87	1.74
Rake	93	1.0	1.65	1.53
Mow and windrow	7	1.0	2.00	.14
Bunch by hand	7	1.0	5.00	.35
Haul and distill 4/	100	1.0	10.70	10.70
Total harvest				14.46
Total man-hours				50.72
				Power-hours
Total tractor-hours				12.11
Total truck-hours				.19
Total horse-hours				.28

1/ From 14 records with an average yield of 31.1 pounds of oil per acre and length of setting of 2.7 years.
2/ Includes spike- and spring-tooth harrow, weeder, and cultipack.
3/ Includes spreading fertilizer.
4/ Includes disposing of roughage or spent mint.

LABOR REQUIREMENTS FOR LIVESTOCK

Data on labor requirements were obtained for milk cows, other cattle, hogs and chickens, as shown in tables 17 to 25. Data from the United States Census on numbers of livestock in the various counties and by size of herd or flock were used as weights in combining the survey data into area and State averages.

Milk Cows

Average man-hours per milk cow varied moderately among the different parts of the State. Requirements ranged from a low of 118 hours per cow in the Northern area to 128 hours in the Southeastern area (table 17). These requirements include the time spent in feeding, milking, and caring for the milk cows and the milk they produce. Time requirements for replacement stock or young cattle are not included even though they are in the same herd.

Man-hours per hundredweight of milk were also lowest in the Northern area because of the lower requirement per cow and because the cows in this area produced a good deal more milk than those in the other areas. One reason for the high production in the Northern area is the existence of a higher proportion of cows of the Holstein breed which are noted as high producers. Average production per cow in this area was 525 pounds or 10 percent above the average for the State. The difference is less when based on production of butterfat.

The relation between size of herd, method of milking, and man-hours per cow is shown in table 18. Within the group of from 5 to 14 cows per herd, the herds milked by hand averaged 7 cows and those milked by machine 10 cows. The three additional cows per herd tended to lower the number of man-hours required per cow. On the other hand, the machine-milked herds produced almost 600 more pounds of milk per cow, which means more labor. If these two influences approximately offset one another, a milking machine saves around 30 hours per cow. This means an annual saving of from 200 to 300 hours in herds of this size. However, because the average herd milked by machine consists of more than 10 cows, the average savings for all machine milked herds is more than 300 hours per herd.

In the large herds, 1.61 man-hours were required per hundredweight of milk. This was less than half the requirement in the smallest herds (1 to 4 cows) and resulted both from fewer hours per cow and from a greater production per cow. These two influences are interrelated, as it takes additional time to care for the milk from a high-producing cow. The difference in man-hours per cow between the smallest and largest herds would be greater if the milk per cow was the same.

Table 17.- Milk cows: Man-hours per head and per cwt. of milk in indicated areas, Indiana, 1950

Area	Records	Cows per herd	Milk produced per cow	Man-hours Per cow	Man-hours Per cwt. milk
	Number	Number	Pounds	Hours	Hours
Northern	32	10	5,575	118.	2.12
Central-South-western	49	7	4,911	120	2.44
South-eastern	20	9	4,353	128	2.94
State	101	9	5,050	121	2.40

Table 18.- Milk cows: Relation of size of herd and method of milking to man-hours of labor per head and per cwt. of milk, Indiana 1950

Size of herd	Method of milking	Records	Cows per herd	Milk produced per cow	Man-hours Per cow	Man-hours Per cwt. milk
		Number	Number	Pounds	Hours	Hours
1 to 4 cows	Hand	26	3	4,234	139	3.28
5 - 14	Hand	25	7	4,914	132	2.69
5 - 14	Machine	34	10	5,492	103	1.88
15 or more	Machine	16	19	5,845	94	1.61

Cattle Other Than Milk Cows

The number of man-hours required to care for a beef cow for a year and her calf up to weaning time varied from 26 in the Northern area to 23 in the Southeastern area (table 19). Twenty-four hours per cow were used in the Central-Southwestern area. This was also the average for all beef cows in the State.

Other cattle, mostly replacement stock in both dairy and beef herds, took an average of 18 man-hours per head. As was true for beef cows, labor requirements for other cattle were highest (20 hours per head) in the Northern part of the State and lowest (16 hours) in the Southeastern area. In the Central-Southwestern area, 18 hours were used per head.

Various practices are followed in finishing cattle for market in Indiana. Some are fed on pasture and others in dry lots. Those fed in dry lots required an average of 2.0 man-hours per head per month while on feed in 1950. The labor used in feeding cattle varies greatly among farms, depending upon such factors as numbers fed, equipment, layout and method of feeding. Labor used per month ranged from an average of 1.9 man-hours per head in the Central-Southwestern area to 2.5 hours per head in the Southeastern area.

Table 19.- Cattle other than milk cows: Man-hours per head in indicated areas, Indiana, 1950

Area	Records 1/	Man-hours per head		
		Beef cows	Other cattle 2/	Cattle fed in dry lot 3/
	Number	Hours	Hours	Hours
Northern	26	26	20	2.2
Central-Southwestern	42	24	18	1.9
Southeastern	21	23	16	2.5
State	89	24	18	2.0

1/ Number giving labor requirements for beef cows or other cattle.

2/ Includes young stock and bulls in dairy as well as beef herds.

3/ Man-hours per month.

Hogs

The two-litter system of hog production is mostly followed in Indiana. In most States there are many more spring than fall litters, but occasionally more sows farrow in the fall than in the spring in Indiana. In 1950 there were about 4 percent fewer fall than spring litters. However, the labor requirements shown in table 20 for all practical purposes are for a sow and two litters.

Labor requirements per sow and litters averaged 61 man-hours in the State. This means about 2.2 hours per hundredweight of hogs produced, using the size of litters and selling weights given and allowing for an increase in weight of the sow. Man-hours per sow in the two northern areas varied very little. Requirements in the Southeastern area were about a fourth above the average for the State. However, there were more pigs per sow to feed and care for in this area.

The size of herd influences considerably the labor requirements for hogs. It took only 60 percent as much time to care for a sow and litters in large herds as in small herds of 1 to 4 sows (table 21). The difference in labor requirements per hundredweight of hogs produced is equally striking. It took around one and three-quarters man-hours per 100 pounds of hogs produced in large herds compared with more than 3 hours per hundredweight produced in small herds. There were fewer pigs per litter in large herds, but they were sold at heavier weights and required fewer hours per head and per unit of production.

Table 20.- Hogs: Man-hours per cow and litters in indicated areas, Indiana, 1950

Area	Records	Sows per herd	Man-hours: Per sow and litters	Man-hours: Per 100 lbs. production	Pigs per litter: Spring	Pigs per litter: Fall
	Number	Number	Hours	Hours	Number	Number
Northern Central-South-western	23	6	61	2.2	6.1	6.2
	45	9	59	2.1	6.1	5.9
South-eastern	21	4	77	2.5	6.8	6.8
State	89	7	61	2.2	6.2	6.1

Table 21.- Hogs: Relation of size of herd to man-hours per sow and litters, Indiana, 1950

Size of herd	Records	Sows per herd	Man-hours: Per sow and litters	Man-hours: Per 100 lbs. production	Pigs per litter: Spring	Pigs per litter: Fall
	Number	Number	Hours	Hours	Number	Number
1 to 4 sows	21	2	86	3.1	6.4	6.3
5 - 9	36	7	69	2.5	6.2	6.2
10 or more	32	17	51	1.8	6.2	6.0

Chickens

Labor requirements for chickens in laying flocks varied little among different parts of the State. They ranged only from 2.27 man-hours per hen in the Northern area to 2.18 hours in the Central-Southwestern area (table 22). Hens in the Northern area produced more eggs, however, and man-hours per unit of egg production was lower than in the other two areas. In the State as a whole, feeding and caring for a hen required 2.21 man-hours; she produced 142 eggs; and 1.56 man-hours were spent per 100 eggs.

Size of the laying flock is an important factor in the amount of labor used per hen. Hens in flocks of 200 or more required less than two-fifths as much labor per hen as those in flocks of fewer than 100 (table 23). The rate of lay was higher in large flocks, which meant more time to gather and care for the eggs per hen. Otherwise, labor requirements per hen would have varied more between large and small flocks. An average of almost a half hour - 29 minutes - was spent each day in the year in caring for the small laying flocks and the eggs they produced. Fifty minutes a day were required by the average flock containing from 100 to 199 layers and 1.13 hours per day were required by the flocks composed of 272 hens and pullets.

Table 22.- Chickens: Man-hours for laying flocks in indicated areas, Indiana, 1950

Area	Records	Hens per flock	Rate of lay	Man-hours Per hen	Man-hours Per 100 eggs
	Number	Number	Eggs	Hours	Hours
Northern	22	197	172	2.27	1.32
Central-Southwestern	44	131	131	2.18	1.66
Southeastern	19	173	125	2.22	1.78
State	85	157	142	2.21	1.56

Table 23.- Chickens: Relation of size of laying flock to man-hours per hen, Indiana, 1950

Size of flock	Records	Hens per flock	Rate of lay	Man-hours Per hen	Man-hours Per 100 eggs
	Number	Number	Eggs	Hours	Hours
99 or fewer hens	15	60	116	2.93	2.53
100 - 199	46	129	139	2.38	1.71
200 or more	24	272	165	1.51	.92

Farmers in Indiana usually buy chicks and raise them to replenish the laying flock. Many are straight-run chicks. The roosters and some of the pullets are sold or eaten and the remainder are added to the laying flock. It took an average of 42 man-hours to raise 100 chicks in the State (table 24). This includes the man-hours required from the time the chicks were bought until they were sold, eaten, or added to the laying flock. Time spent per chick varied little among parts of the State. It was slightly above the State average in the Central and Southwestern area and below in the Northern and Southeastern areas.

Less labor was required per chick raised in large than in small flocks (table 25). In the large flocks 527 chickens were raised, requiring 0.35 man-hours per bird. The small flocks raised consisted of 233 chicks. They required 29 percent more time, or 45 hours per 100 chicks.

Table 24.- Chickens: Man-hours for replacement flocks in indicated areas, Indiana, 1950

Area	Records	Chickens per flock	Man-hours per chicken raised
	Number	Number	Hours
Northern	20	328	0.41
Central-Southwestern	43	293	.43
Southeastern	18	361	.41
State	81	317	.42

Table 25.- Chickens: Relation of size of replacement flock to man-hours per chicken raised, Indiana, 1950

Size of flock	Records	Chickens per flock	Man-hours per chicken raised
	Number	Number	Hours
399 or fewer chickens	58	233	0.45
400 or more	23	527	.35

LABOR REQUIREMENTS FOR FARM MAINTENANCE

Time spent on farm-maintenance jobs per farm is shown in tables 26 and 27. Numbers of farms of various sizes from the 1950 Census were used as weights in deriving the area and State averages and those of different sizes of farms.

An average of 570 man-hours were spent per farm in the State doing farm-maintenance jobs. This was almost 14 percent of the total time spent at farm work by all workers. All farm work and farm maintenance work includes the time spent by farm workers only and excludes time spent by urban workers such as mechanics, bricklayers, and carpenters. In the Northern part of the State, farm-maintenance work per farm took 470 man-hours or 12.4 percent of all farm work. More time was spent in the other areas, both in numbers of hours and in relation to total hours for farm work. More than 600 hours were required to maintain the farm plant in these areas. This was 14.0 and 14.7 percent of all farm work in the Central-Southwestern and in the Southeastern areas, respectively.

In the State as a whole, almost a fourth of the 570 man-hours for farm-maintenance work was spent in business trips. Farm labor used in constructing and maintaining buildings took 19 percent, and repairing and maintaining farm machinery (including tractors, trucks, and farm share of automobile) required 13 percent. Fourteen percent was used in constructing and maintaining fences, and farm business other than business trips used 10 percent. Other farm-maintenance jobs which required less than 10 percent of the time each included conservation work not a part of a regular field operation, work on permanent pasture, time spent in farm forestry, constructing and maintaining drainage structures, and miscellaneous jobs such as mowing weeds along roadsides and in fence rows, and maintaining farm roads and lanes.

As size of farm increased, the man-hours for farm work also rose (table 27). But the hours spent on farm-maintenance jobs increased in about the same proportion. Consequently, the proportion of the time for all farm work that was spent on farm-maintenance jobs was about the same regardless of total acres in the farm.

Table 26.- Man-hours per farm for all farm work and for farm maintenance in indicated areas, Indiana, 1950

Area	Records	Man-hours per year		
		All farm work	Farm maintenance	
			Total	Percentage of all farm work
	Number	Hours	Hours	Percent
Northern	31	3,788	470	12.4
Central-South-western	50	4,310	604	14.0
South-eastern	18	4,213	618	14.7
State	99	4,146	570	13.7

Table 27.- Man-hours per farm for all farm work and for farm maintenance by size of farm, Indiana, 1950

Size of farm	Records	Man-hours per year		
		All farm work	Farm maintenance	
			Total	Percentage of all farm work
	Number	Hours	Hours	Percent
Under 179 acres	33	3,955	544	13.8
180 - 259 acres	31	4,523	619	13.7
260 acres and over	35	5,338	735	13.8

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